LAWRENCE LIVERMORE
REPORT

A weekly collection of scientific and technological achievements from Lawrence Livermore National Laboratory: March 8-March 15, 2010

**Getting to the heart of matter**

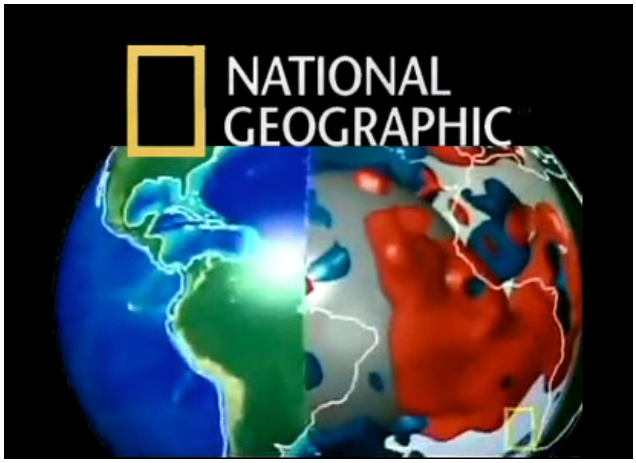

Between 1992 and 2007, 17 kilogramsg of highly enriched uranium was seized from smugglers around the world, along with 400 grams of plutonium. Though that is not enough for a proper atom bomb, it is still worrying.

The material that has been found to date could be used to make a "radiological" weapon, by blowing it up and scattering it around a city using conventional explosives.

The Lab's Ian Hutcheon can find out exactly how dangerous the captured materials are. He is one of those charged with analyzing this captured material, to discover how dangerous it really is and where it came from -- and whether it has been stolen from legitimate nuclear projects or made on the sly.

To read more, to go to http://www.economist.com/science-technology/displaystory.cfm?STORY_ID=15577536&REFRESH=0&FSRC=rss

**Inside the science of nuclear weapons**




A recent  National Geographic Explorer documentary focused on "Inside the Nuclear Threat" and Livermore's Jay Zucca was there to explain how nuclear explosions can be detected that might take place thousands of miles away.

It comes down to shaking, in the form of seismic waves.

Teams from LLNL have been working for decades on how to detect whether seismic activity is from natural events such as earthquakes or mine collapses or whether it is tied to a nuclear weapon.

"Nuclear bombs shake the world differently than natural events," LLNL's Jay Zucca says in the program. "They push on the earth evenly in all directions."

To see more, go to

https://publicaffairs.llnl.gov/news/lab_report/movies/NationalGEO_NuclearThreat_0310.mov

***Discovery* discovers stardust secrets**


**Secondary electron microscopy image of a speck of comet material showing mineral shards surrounded by compressed aerogel.**

A speck of comet material that was found on the comet Wild 2 and returned from the Stardust mission in 2006 isn't exactly made up of what scientists had in mind.

What they thought had formed in the nether regions of the solar system out in the area near Pluto actually formed closer to the sun, according to LLNL's Jennifer Matzel.

Based on detailed chemical analysis, the speck, which measures about 5 microns -- about the width of a single human red blood cell -- spent a fair amount of time in the inner solar system before it was transported out near Pluto and became incorporated into the comet.

It turns out comets, believed to contain pristine remains of materials from which the solar system formed, are not so simple.

To read more, go to http://news.discovery.com/space/comet-speck-solar-system.html

**Sleuthing loose nukes**


**Julie Gostic**

The Nuclear Forensic and Attribution Act, signed into law last month, aims to improve coordination among U.S. agencies that probe cases of nuclear terrorism or nuclear smuggling.

It's also designed to attract a new generation of scientists to the field to fill the looming shortage of this kind of expertise as current scientists near retirement. And some of those very scientists are housed at the Lab.

One of these nuclear sleuths is Julie Gostic. Her motivation: the 9/11 terrorist attacks. The ingredient that pushed her even further was a Department of Energy research grant. "It was my call to duty," Gostic said.

To read more, go to https://publicaffairs.llnl.gov/news/lab_report/2010/gostic.pdf

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**Photo of the week**

**Knock knock**: Whooo's there? A Great Horned Owl

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LLNL applies and advances science and technology to help ensure national security and global stability. Through multi-disciplinary research and development, with particular expertise in high-energy-density physics, laser science, high-performance computing and science/engineering at the nanometer/subpicosecond scale, LLNL innovations improve security, meet energy and environmental needs and strengthen U.S. economic competitiveness. The Laboratory also partners with other research institutions, universities and industry to bring the full weight of the nation's science and technology community to bear on solving problems of national importance.

To send input to the Livermore Lab Report, send e-mail mailto:labreport@llnl.gov.

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https://publicaffairs.llnl.gov/news/lab_report/2010index.html